

Number Properties and Operations

Whole number sense and addition and subtraction are key concepts and skills developed in early childhood. Students build on their number sense and counting sense to develop multiplication and division. They move flexibly and fluently through basic number facts, operations and representations. Their understanding of the base-10 number system expands to include decimals. They examine various meanings and models of fractions. They explore data, perform measurements and examine patterns as part of the development process for number and operations, using other mathematics strands to enrich number. Computational fluency with whole numbers, relationships among decimals and fractions and techniques for reasonable estimations represent elementary number.

End of Primary	4 th Grade	5 th Grade
Number Sense		
<p>MA-EP-1.1.1 Students will:</p> <ul style="list-style-type: none"> • Apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe whole numbers (0 to 999): • Apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe fractions (halves, thirds, fourths); • Apply these numbers to represent real-world problems; and • Explain how the base 10 number system relates to place value. <p>DOK – 2</p> <p><i>MA-EP-1.1.1a</i> <i>Students will read, write, and rename whole numbers (0 to999) and apply to real-world and/or mathematical situations.</i></p>	<p>MA-04-1.1.1 Students will:</p> <ul style="list-style-type: none"> • Apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to represent whole numbers (0 to 99,999): • Apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe commonly used fractions through tenths and decimals through hundredths; • Apply these numbers to represent real-world problems; and • Explain how the base 10 number system relates to place value. <p>DOK - 2</p> <p><i>MA-04-1.1.1a</i> <i>Students will read, write, and rename whole numbers, fractions, and decimals, and apply to real-world and/or mathematical situations.</i></p>	<p>MA-05-1.1.1 Students will:</p> <ul style="list-style-type: none"> • Apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to represent whole numbers (0 to 99,999,999); • Apply multiple representations (e.g., drawings, manipulatives, base-10 blocks, number lines, expanded form, symbols) to describe commonly-used fractions, mixed numbers, and decimals through thousandths; • Apply these numbers to represent real-world problems; and • Explain how the base-10 number system relates to place value. <p>DOK - 2</p> <p><i>MA-05-1.1.1a</i> <i>Students will read, write, and rename whole numbers, fractions, and decimals, and apply to real-world and/or mathematical situations.</i></p>

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MA-EP-1.1.2 Students will compare ($<$, $>$, $=$) whole numbers and fractions (limited to pictorially), and explain how fractions, decimals (as money only) and whole numbers relate (equivalence, order). DOK - 2	MA-04-1.1.2 Students will compare ($<$, $>$, $=$) whole numbers, commonly used fractions through tenths, and decimals through hundredths, and explain how commonly used fractions, decimals, and whole numbers relate (equivalence, order). DOK - 2	MA-05-1.1.2 Students will compare ($<$, $>$, $=$) whole numbers (0 to 99,999,999), fractions, and decimals (through thousandths), and explain how commonly used fractions, decimals, and whole numbers relate (equivalence, order). DOK - 2
Estimation		
MA-EP-1.2.1 Students will apply and describe appropriate strategies for estimating quantities of objects and computational results (limited to addition and subtraction). DOK - 2	MA-04-1.2.1 Students will apply and describe appropriate strategies for estimating quantities of objects and computational results. DOK - 2	MA-05-1.2.1 Students will apply and describe appropriate strategies for estimating quantities of objects and computational results in real-world situations. DOK - 2
Number Operations		
MA-EP-1.3.1 Students will analyze real-world situations to identify the appropriate mathematical operations, and will apply operations to solve real-world problems with the following constraints: <ul style="list-style-type: none"> • Add and subtract whole numbers with three digits or less; • Multiply whole numbers of 10 or less; • Add and subtract fractions with like denominators less than four; and • Add and subtract decimals related to money. DOK - 2 <i>MA-EP-1.3.1a</i> <i>Students will skip-count forward and backward by 2s, 5s, 10s, and 100s.</i> <i>MA-EP-1.3.1b</i> <i>Students will divide two digit numbers by single digit divisors (with or without remainders) in real-world and/or mathematical problems.</i>	MA-04-1.3.1 Students will analyze real-world situations to identify the appropriate mathematical operations, and will apply operations to solve real-world problems with the following constraints: <ul style="list-style-type: none"> • Add and subtract whole numbers with four digits or less; • Multiply whole numbers with two digits or less; • Divide whole numbers with three digits or less by single-digit divisors (with or without remainders); • Add and subtract fractions with like denominators less than 10; and • Add and subtract decimals through hundredths. DOK - 2 <i>MA-04-1.3.1a</i> <i>Students will skip-count forward and backwards by 2s, 3s, 4s, 5s, 10s, 20s, 25s, 50s, 100s, 1,000s, and 10,000s.</i>	MA-05-1.3.1 Students will analyze real-world situations to identify the appropriate mathematical operations, and will apply operations to solve real-world problems with the following constraints: <ul style="list-style-type: none"> • Add, subtract, multiply, and divide whole numbers (less than 100,000,000); • Add and subtract fractions with like denominators through 16, with sums less than or equal to one; and • Add and subtract decimals through hundredths. DOK - 2 <i>MA-05-1.3.1a</i> <i>Students will skip-count forwards and backwards.</i> <i>MA-05-1.3.1b</i> <i>Students will multiply decimals through tenths.</i>

Ratios and Proportional Reasoning		
Properties of Numbers and Operations		
MA-EP-1.5.1 Students will identify and provide examples of odd numbers, even numbers, and multiples of numbers, and will apply these numbers to solve real-world problems. DOK - 2	MA-04-1.5.1 Students will identify and determine odd numbers, even numbers, multiples of numbers, and factors of a number, and will apply these numbers to solve real-world problems. DOK - 2	MA-05-1.5.1 Students will identify and determine composite numbers, prime numbers, multiples of a number, factors of numbers, and least common multiples (LCM), and will apply these numbers to solve real-world problems. DOK - 2
<i>MA-EP-1.5.2a</i> <i>Students will use the commutative properties, the identity properties of addition and multiplication, and the zero property of multiplication in written and mental computation.</i>	<i>MA-04-1.5.2a</i> <i>Students will use the commutative properties, the identity properties of addition and multiplication, and the zero property of multiplication in written and mental computation.</i>	<i>MA-05-1.5.2a</i> <i>Students will use the commutative properties, the associative properties, the identity properties of addition and multiplication, and the zero property of multiplication in written and mental computation.</i>

Students translate from measuring using nonstandard units to using standard units of measurement. They identify measurable attributes of objects, estimate and measure weight, length, perimeter, area, angles, temperature, time and money. They convert units within the same measurement system.

End of Primary	4 th Grade	5 th Grade
Measuring Physical Attributes		
<p>MA-EP-2.1.1 Students will apply standard units to measure:</p> <ul style="list-style-type: none"> • Weight (nearest pound); • Length (nearest half-inch or nearest centimeter); • Time (nearest quarter hour); and • Money (identify coins and bills by value). <p>DOK - 2</p> <p><i>MA-EP-2.1.1a</i> <i>Students will use standard units to measure temperature in Fahrenheit and Celsius to the nearest degree.</i></p> <p><i>MA-EP-2.1.1b</i> <i>Students will choose appropriate tools (e.g., thermometer, scales, balances, clock) for specific measurement tasks.</i></p> <p><i>MA-EP-2.1.1c</i> <i>Students will use nonstandard and standard units of measurement to identify measurable attributes of an object (length – in, cm; weight – oz, lb) and make an estimate using appropriate units of measurement.</i></p> <p><i>MA-EP-2.1.1d</i> <i>Students will use units of measurement to describe and compare attributes of objects to include length (in, cm), width, height, money</i></p>	<p>MA-04-2.1.1 Students will apply standard units to measure:</p> <ul style="list-style-type: none"> • Weight (ounce, pound; gram, kilogram); • Length (nearest quarter inch or nearest centimeter); • Perimeter; area (figures that can be divided into rectangular shapes); • Time (nearest five minutes); and • Temperature (Fahrenheit and Celsius). <p><i>MA-04-2.1.1a</i> <i>Students will choose appropriate tools (e.g., thermometer, scales, balances, clock, meter stick, yardstick, ruler) for specific measurement tasks.</i></p> <p><i>MA-04-2.1.1b</i> <i>Students will use nonstandard and standard units of measurement to identify measurable attributes of an object (length and width) using appropriate units of measurement.</i></p> <p><i>MA-04-2.1.1c</i> <i>Students will use measurements to describe and compare attributes of objects to include length (in, ft, yd, mile; cm, m, km), width, height, money (cost), temperature, and weight (oz, lb, ton; g, kg) and sort objects and compare attributes.</i></p>	<p>MA-05-2.1.1 Students will apply standard units to measure:</p> <ul style="list-style-type: none"> • Weight (ounce, pound; gram, kilogram); • Length (nearest eighth-of-an-inch or nearest centimeter); • Perimeter; • Area (figures that can divided into rectangular shapes); • Time (nearest minute); • Temperature (Fahrenheit and Celsius); and • Angles (nearest degree). <p>DOK - 3</p> <p><i>MA-05-2.1.1a</i> <i>Students will choose appropriate tools (e.g., protractor, meter stick, ruler) for specific tasks and apply skills to solve real-world and/or mathematical problems.</i></p> <p><i>MA-05-2.1.1b</i> <i>Students will use measurements to identify, describe, sort, and compare attributes of objects and apply these to solve real-world and/or mathematical problems.</i></p> <p><i>MA-05-2.1.1c</i> <i>Students will measure volume of rectangular prisms, liquid capacity, and money using standard units and apply these skills to solve</i></p>

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Italics – Supporting Content Statement

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<i>(cost), temperature (F), and weight (oz, lb), and sort objects and compare attributes by shape, size, and color.</i>	MA-04-2.1.1d <i>Students will use nonstandard and standard units to measure angles (as compared to 90°).</i>	<i>real-world and/or mathematical problems.</i>
MA-EP-2.1.2a <i>Students will estimate weight, length, perimeter, area, angles, and time using appropriate units of measurement.</i>	MA-04-2.1.2a <i>Students will estimate weight, length, perimeter, area, angles, and time using appropriate units of measurement.</i>	MA-05-2.1.2 Students will estimate weight, length, perimeter, area, angles, and time using appropriate units of measurement. DOK - 2
Systems of Measurement		
MA-EP-2.2.1a <i>Students will describe, define, give examples of, and use to solve real-world and/or mathematical problems nonstandard and standard (U.S. Customary, metric) units of measurement to include length (in., cm.), time, money, temperature (Fahrenheit) and weight (oz., lb.); and students will determine elapsed time by half hours.</i>	MA-04-2.2.1a <i>Students will describe, define, give examples of, and use to solve real-world and/or mathematical problems nonstandard and standard (U.S. Customary, metric) units of measurement (e.g., weight/mass - oz., lbs., tons, g, kg; length – in., ft., yd., mile, cm, m, km; area in square units); money; and students will determine elapsed time to the nearest quarter hour.</i> MA-04-2.2.1b <i>Students will use standard units to measure money, time (elapsed), and temperature (e.g., above and below zero).</i>	MA-05-2.2.1a <i>Students will describe, define, give examples of, and use to solve real-world and/or mathematical problems nonstandard and standard (U.S. Customary, metric) units of measurement</i>
MA-EP-2.2.2a <i>Students will convert units within the same measurement including money (dollars, cents), time (minute, hour), weight (ounce, pound), and length (inch, foot).</i>	MA-04-2.2.2 Students will convert units within the U.S. customary measurement system, including money, time (seconds, minutes, hours), weight (ounces, pounds), and length (inches, feet, yards). DOK - 2	MA-05-2.2.2 Students will convert units within the same measurement system [U.S. customary (inches, feet, yards, miles; ounces, pounds, tons), metric (millimeters, centimeters, meters, kilometers; grams, kilograms), money, or time (seconds, minutes, hours)], and determine elapsed time. DOK - 2

Geometry Students explore and find basic geometric elements and terms, two-dimensional shapes and three-dimensional objects. They find and use symmetry. They move two-dimensional figures in a plane and explore congruent and similar figures.		
End of Primary	4th Grade	5th Grade
Shapes and Relationships		
MA-EP-3.1.1 Students will describe and provide examples of basic geometric elements and terms (sides, edges, faces, vertices, angles), and will apply these elements to solve real-world problems. DOK - 2	MA-04-3.1.1 Students will describe and provide examples of basic geometric elements and terms [points, segments, lines (perpendicular, parallel, intersecting), rays, angles [acute, right, obtuse], sides, edges, faces, vertices], and will apply these elements to solve real-world problems. DOK - 2	MA-05-3.1.1 Students will describe and provide examples of basic geometric elements and terms [points, segments, lines (perpendicular, parallel, intersecting), rays, angles (acute, right, obtuse), sides, edges, faces, vertices, radius, diameter], and will apply these elements to solve real-world problems. DOK - 2
MA-EP-3.1.2 Students will describe and provide examples of basic two-dimensional shapes (circles, triangles, squares, rectangles, trapezoids, rhombuses, hexagons), and will apply these shapes to solve real-world problems. DOK - 2	MA-04-3.1.2 Students will describe and provide examples of basic two-dimensional shapes [circles, triangles (right, equilateral), squares, rectangles, trapezoids, rhombuses, pentagons, hexagons, octagons], and will apply these shapes to solve real-world problems. DOK - 2	MA-05-3.1.2 Students will describe and provide examples of basic two-dimensional shapes [circles, triangles (right, equilateral), all quadrilaterals, pentagons, hexagons, octagons], and will apply these shapes to solve real-world problems. DOK - 2
MA-EP-3.1.3 Students will describe and provide examples of basic three-dimensional shapes (spheres, cones, cylinders, pyramids, cubes), and will apply these shapes to solve real-world problems. DOK - 1	MA-04-3.1.3 Students will describe and provide examples of basic three-dimensional shapes (spheres, cones, cylinders, pyramids, cubes, triangular and rectangular prisms), and will apply these shapes to solve real-world problems. DOK - 2	MA-05-3.1.3 Students will describe and provide examples of basic three-dimensional shapes (spheres, cones, cylinders, pyramids, cubes, triangular and rectangular prisms), and will apply these shapes to solve real-world problems. DOK - 3
MA-EP-3.1.4a <i>Students will identify and describe congruent figures in real-world and/or mathematical situations.</i>	MA-04-3.1.4a <i>Students will identify and describe congruent and similar figures in real-world and/or mathematical situations.</i>	MA-05-3.1.4 Students will identify and describe congruent and similar figures in real-world or mathematical situations. DOK - 2

Transformations of Shapes		
MA-EP-3.2.1 Students will describe and provide examples of line symmetry in real-world situations or will apply one line of symmetry to construct a simple geometric design. DOK - 2	MA-04-3.2.1 Students will describe and provide examples of line symmetry in real-world situations or will apply one or two lines of symmetry to construct a simple geometric design. DOK - 2	MA-05-3.2.1 Students will describe and provide examples of line symmetry in real-world situations or will apply line symmetry to construct a geometric design DOK - 3
	MA-04-3.2.2 Students will identify basic two-dimensional shapes in different orientations using 90° rotations (turns) around a point of rotation, reflections (flips), and translations (slides) within a plane. DOK - 1	MA-05-3.2.2 Students will identify or draw 90° rotations, reflections, or translations of basic shapes within a plane. DOK - 2
Coordinate Geometry		
<i>MA-EP-3.3.1a</i> <i>Students will locate points on a grid representing a positive coordinate system.</i>	MA-04-3.3.1 Students will identify and graph ordered pairs on a positive coordinate system scaled by ones or locate points on a grid. DOK - 2	MA-05-3.3.1 Students will identify and graph ordered pairs on a positive coordinate system scaled by ones, twos, threes, fives, or tens; locate points on a grid; and apply graphing in the coordinate system to solve real-world problems. DOK - 2

Data Analysis and Probability		
Students pose questions, plan and collect data, organize and display data and interpret displays of data. They generate outcomes for simple probability activities, determine fairness of probability games and explore likely and unlikely events.		
End of Primary	4th Grade	5th Grade
Data Representations		
MA-EP-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, tally tables, pictographs, bar graphs, circle graphs with two or three sectors, line plots, two-circle Venn diagrams). DOK - 3 <i>MA-EP-4.1.1a</i> <i>Students will collect data.</i>	MA-04-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, tally tables, pictographs, bar graphs, circle graphs, line plots, Venn diagrams). DOK - 3 <i>MA-04-4.1.1a</i> <i>Students will collect data.</i>	MA-05-4.1.1 Students will analyze and make inferences from data displays (drawings, tables/charts, tally tables, pictographs, bar graphs, circle graphs, line plots, Venn diagrams, line graphs). DOK - 3 <i>MA-05-4.1.1a</i> <i>Students will collect data (e.g., tallies, surveys) and explain how the skills apply in real-world and/or mathematical situations.</i>
<i>MA-EP-4.1.2a</i> <i>Students will organize and display data.</i>	MA-04-4.1.2 Students will construct data displays (pictographs, bar graphs, line plots, Venn diagrams, tables). DOK - 2	MA-05-4.1.2 Students will construct data displays (pictographs, bar graphs, line plots, line graphs, Venn diagrams, tables). DOK - 2
Characteristics of Data Sets		
	<i>MA-04-4.2.1a</i> <i>Students will determine the median, mode (for a data set with more than one mode), and range of a set of data.</i>	MA-05-4.2.1 Students will determine and apply the mean, median, mode (for a data set with no more than one mode), and range of a set of data. DOK - 2
Experiments and Samples		
<i>MA-EP-4.3.1a</i> <i>Students will pose questions that can be answered by collecting data</i>	<i>MA-04-4.3.1a</i> <i>Students will pose questions that can be answered by collecting data.</i>	<i>MA-05-4.3.1a</i> <i>Students will describe and give examples of the process of using data to answer questions (e.g., pose a question, plan, collect data, organize and display data, interpret data to answer questions)</i>
Probability		
	MA-04-4.4.1 Students will determine all possible outcomes of an activity with up to six possible outcomes. DOK - 2	MA-05-4.4.1 Students will determine all possible outcomes of an activity with up to 12 possible outcomes. DOK - 2

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<p><i>MA-EP-4.4.2a</i> <i>Students will describe and give examples of the probability of an unlikely event (near zero) and a likely event (near one).</i></p>	<p>MA-04-4.4.2 Students will determine the likelihood of an event, expressed as a fraction, and the fairness of simple probability games. DOK - 1</p> <p><i>MA-04-4.4.2a</i> <i>Students will describe and give examples of the probability of an unlikely event (near zero) and a likely event (near one).</i></p>	<p>MA-05-4.4.2 Students will determine the likelihood of an event, expressed as a fraction, and the fairness of simple probability games. DOK - 2</p> <p><i>MA-05-4.4.2a</i> <i>Students will describe and give examples of the probability of an unlikely event (near zero) and a likely event (near one).</i></p>
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Algebraic Thinking		
Students explore and examine patterns and develop rules to go with patterns. They generate input-output for functions and create tables to analyze functions. They use ordered pairs and plot points in the first quadrant of the Cartesian plane. Students use number sentences with missing values.		
End of Primary	4 th Grade	5 th Grade
Patterns, Relations, and Functions		
MA-EP-5.1.1 Students will extend simple patterns (e.g., 2,4,6,8,...; ◊△△△...). DOK - 2	MA-04-5.1.1 Students will extend patterns (e.g., 108, 208, 308, 408,...; □○○△□○○△ ...) from real world and/or mathematical situations; compare simple patterns (e.g., numbers, pictures, words; e.g., △□△□△□ ; △○○△○○); and describe rules for simple number patterns (e.g., 1, 3, 5, 7, ...; 5, 10, 15, 20, ...; 30, 27, 24, 21, ...). DOK - 3	MA-05-5.1.1 Students will extend patterns or describe rules for patterns (e.g., numbers, pictures, tables, words) from real-world or mathematical situations. DOK - 3
MA-EP-5.1.2 Students will describe functions (input-output) through pictures and words. DOK - 1	MA-04-5.1.2 Students will describe functions (input-output) through pictures, tables, and words; and will analyze functions, from a table, based on real-world and/or mathematical situations. DOK - 2	MA-05-5.1.2 Students will describe functions (input-output) through pictures, tables, or words, and will construct tables to analyze functions based on real-world or mathematical situations. DOK – 2
Variables, Expressions, and Operations		
		MA-05-5.2.1 Students will model verbal descriptions of real-world situations using a variable or a missing value. DOK - 2

Equations and Inequalities		
<p>MA-EP-5.3.1 Students will model real-world situations with simple number sentences (equations and inequalities) with a missing value (e.g., $2 + [] = 7$, $[] < 6$), and apply number sentences to solve real-world problems. DOK - 2</p>	<p>MA-04-5.3.1 Students will model real-world situations with simple number sentences (equations and inequalities) with a variable or a missing value (e.g., $4 = 7 - []$, $N + 5 > 14$, $\frac{1}{2} + N = 1$), and apply number sentences to solve real world problems. DOK - 2</p>	<p>MA-05-5.3.1 Students will model real-world situations with simple number sentences (equations and inequalities) with a variable or missing value (e.g., $4 = 2 \times N$, $[] + 5 > 14$) and apply number sentences to solve real-world problems. DOK - 2</p>

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